TITLE OF THE INVENTION

PRINTING APPARATUS USING NETWORK

BACKGROUND OF THE INVENTION

1. Field of the Invention

5   This invention relates to a printing apparatus
using a network which performs the printing operation
according to a printing job received from a computer
device in a network environment in which a plurality of
computer devices and a plurality of network printing
10   apparatuses are connected to a network.

2. Description of the Related Art

For example, in an office, a network to which
computer devices such as a plurality of PCs (personal
computers) and a plurality of network printing
15   apparatuses are connected is configured. In the above
network, for example, a user makes a printing request
to the network printing device via the PC. In this
case, if the network printing apparatus has received
a printing request for making a large amount of prints
20   from a different user, the network printing apparatus
cannot perform the printing job requested from the
former user until the printing operation for a large
amount of prints is terminated. Therefore, the
printing request made by the former user is kept in
25   the wait state. Further, if a printing request is made
to a network printing apparatus in which printing paper
or toner/ink has been used up, the network printing

apparatus does not perform the requested printing
operation until an error is cleared.

In order to avoid the above situation, it is
necessary to previously register an instruction in the
5   network printing apparatus to transfer the printing job
to another network printing apparatus.

BRIEF SUMMARY OF THE INVENTION

An object of this invention is to provide a
printing apparatus using a network which can easily
10   transfer a printing job spooled therein to another
network printing apparatus specified by a user.

According to an aspect of the present invention,
there is provided a first printing apparatus using a
network which is used in a network environment in which
15   a plurality of computer devices and a plurality of
network printing apparatuses are connected to a network
and comprises a spool section which spools printing
jobs received from the computer devices, a display
section which displays information of the printing
20   jobs and information of the other network printing
apparatuses in response to a preset operation,
an operating section which is used to receive
specification of the printing job based on the
information of the printing jobs and specification
25   of the other network printing apparatus based on the
information of the other network printing apparatuses,
and a transfer section which transfers the specified

printing job to the specified network printing apparatus.

According to another aspect of the present invention, there is provided a second printing apparatus using a network which is used in a network environment in which a plurality of computer devices and a plurality of network printing apparatuses are connected to a network and comprises a spool section which spools printing jobs received from the computer devices, a web page section which stores a web page by use of which the spooled printing jobs and information of the other network printing apparatuses are provided to the computer and specification of the printing job and specification of the network printing apparatus are received, and a transfer section which transfers the specified printing job to the specified network printing apparatus.

According to still another aspect of the present invention, in a printing system using a network which is used in a network environment in which a plurality of computer devices and a plurality of network printing apparatuses are connected to a network, each of the computer devices includes an application section which stores an application used to collect information of printing jobs spooled in the network printing apparatus to which the computer device itself transmits the printing job together with information of the other

network printing apparatuses, receive specification of the printing job and specification of the network printing apparatus based on the above information and transmit the specifications as information to the network printing apparatus and each of the network printing apparatuses includes a spool section which spools printing jobs received from the computer devices, a collecting section which collects information of the spooled printing jobs and information of the other network printing apparatuses when a preset instruction is received from the application, and a transfer section which transfers the specified printing job to the specified network printing apparatus.

Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed out hereinafter.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

The accompanying drawings, which are incorporated in and comprise a part of the specification, illustrate presently embodiments of the invention, and together with the general description given above and the detailed description of the embodiments given below,

serve to explain the principles of the invention.

FIG. 1 is a view showing a network to which a PC and a plurality of network printing apparatuses in a first embodiment of this invention are connected;

5   FIG. 2 is a diagram showing a general control block of the network printing apparatus in the first embodiment;

FIG. 3 is a view showing an operating section of the network printing apparatus in the first embodiment;

10   FIG. 4 is a diagram showing a control block of the PC in the first embodiment;

FIG. 5 is a diagram showing the flow of a process which a CPU in the first embodiment performs;

FIG. 6 is a diagram showing a general control

15   block of a network printing apparatus in a second embodiment of this invention;

FIG. 7 is a diagram showing the flow of a process which a CPU in the second embodiment performs;

FIG. 8 is a diagram showing a general control

20   block of a network printing apparatus in a third embodiment of this invention;

FIG. 9 is a diagram showing a control block of the PC in the third embodiment; and

FIG. 10 is a diagram showing the flow of a process

25   which a CPU in the third embodiment performs.

DETAILED DESCRIPTION OF THE INVENTION

There will now be described embodiments of this

invention with reference to the accompanying drawings.

(First Embodiment)

FIG. 1 shows a network 5 to which a plurality of network printing apparatuses 1, 2, 3 and a PC 4 used as a computer device are connected. Further, FIG. 3 shows an operating panel 6 which is common in each of the network printing apparatuses 1, 2, 3 and includes a liquid crystal panel 7 for display and a button section 81 which has a printing job transfer button 8 used to input transfer of the printing job and a plurality of buttons 9, 10, 11 used to input various information items.

For example, a protocol used for the printing request on the network 5 is an LPR (line printer request), IPP (internet printer protocol), RAW, IPX (internet protocol exchange) or the like. Further, for example, a protocol used for discovery on the network is an SLP (service location protocol), SSDP (simple service discovery protocol) or the like.

FIG. 2 shows a control block which is common in each of the network printing apparatuses 1, 2, 3. A CPU (central processing unit) 12 controls the operation of each of the network printing apparatuses 1, 2, 3 as a control section main body. In a ROM (read only memory) 13, a program based on which the CPU 12 is operated is stored. In a RAM (random access memory) 14, an area such as a work area used for making

calculations when the CPU 12 executes the program is formed. An I/F (interface) 15 is used for connection with the network 5. Display on the liquid crystal panel 7 is controlled by a display control section 16

5   and inputting from the button section 81 is controlled by an input control section 17. An HDD (hard disk drive) 18 is controlled by an HDD control section 19. A printing section 20 for printing is controlled by a printing control section 21.

10   The CPU 12 is connected to the ROM 13, RAM 14, I/F 15, display control section 16, input control section 17, HDD control section 19 and printing control section 21 via a bus line 22.

The HDD 18 includes a spool section 181 which

15   spools a printing job received from the PC 4 and a transfer section 182 storing a mode in which a specified printing job is transferred to a specified network printing apparatus. Further, in the HDD 18, a user ID of each PC connected to the network 5 is

20   registered and setting of an administrator or a general user is stored for each user ID.

FIG. 4 is a diagram showing a general control block of the PC 4. A CPU 23 controls the operation of the PC 4 as a control section main body. In a ROM 24,

25   a program based on which the CPU 23 is operated is stored. In a RAM 25, an area such as a work area used for making calculations when the CPU 23 executes the

program is formed. An I/F (interface) 26 is used for
connection with the network 5. A display 27 is
controlled by a display control section 28. A keyboard
29 is controlled by a keyboard control section 30.

5   An HDD 31 is controlled by an HDD control section 32.

The CPU 23 is connected to the ROM 24, RAM 25,
I/F 26, display control section 28, keyboard control
section 30 and HDD control section 32 via a bus
line 33.

10   FIG. 5 is a diagram showing the flow of a process
which the CPU 12 of the network printing apparatus
performs.

A printing job is received in step ST101.
The printing job is spooled in the spool section 181 in

15   step ST102. Whether the printing job spooled in the
spool section 181 has been printed or not is determined
in step ST103. If it is determined in the above
determination step that the printing job has been
printed, the process is terminated. If it is

20   determined that the printing job has not been printed,
whether a transfer request of the printing job and
inputting of a user ID from the operating section 6 are
made or not is determined in step ST104. If it is
determined that the transfer request of the printing

25   job and inputting of the user ID have not been made,
the process returns to step ST103. The process of
steps ST103, ST104 is repeatedly performed until the

printing operation of the printing job spooled in the spool section 181 is terminated.

If it is determined that the transfer request of the printing job and inputting of the user ID have been made, a list of the printing jobs spooled in the spool section 181 is displayed on the liquid crystal panel 7 in step ST105. Whether the input user ID indicates an administrator or a general user is determined in step ST106. If it is determined in the above determination step that the user ID indicates the administrator, the specification of a printing job to be transferred among all of the printing jobs is received in step ST107. If it is determined that the user ID indicates the general use, the specification of a printing job to be transferred among the printing jobs transmitted by the user who inputs the user ID is received in step ST108.

Next, network printing apparatuses to which the printing job can be transferred are searched for by use of a protocol such as SLP and SSDP in step ST109. Then, communication is made to each of the network printing apparatuses to which the printing job can be transferred by use of a protocol such as SLP and SSDP and the spool states of the printing jobs in the network printing apparatuses are searched for in step ST110. Lists of the network printing apparatuses to which the printing job can be transferred and the spool states of the network printing apparatuses are

displayed on the liquid crystal panel 7 in step ST111.

After this, the specification of the network
printing apparatus to which the printing job is
transferred among the network printing apparatuses

5   displayed is received in step ST112. The specified
printing job is transferred to the specified network
printing apparatus by use of a protocol such as LPR,
IPP, RAW, IPC in step ST113 and the process is
terminated.

10   In the above network 5, a user of the PC 4
registered as a general user operates the PC 4 to make
a printing request to the network printing apparatus 2,
for example. The network printing apparatus 2
temporarily spools a printing job in the spool section

15   181. The network printing apparatus 2 instantly
performs the printing operation of the printing job if
another printing job is not spooled, but the network
printing apparatus 2 does not instantly perform the
printing operation of the printing job if the network

20   printing apparatus 2 is performing the printing
operation of another printing job or if a plurality of
printing jobs are spooled in the spool section 181.

That is, when the user goes to the network
printing apparatus 2 to pick up printed matter after

25   the user made a printing request, the printed matter
requested by the user is not yet completed in some
cases. At this time, the user inputs a user ID by use

of a plurality of buttons 9, 10, 11 of the network
printing apparatus 2. Then, the user inputs the
printing job transferring button 8. If the above
inputting operation is performed, the network printing
5   apparatus 2 displays the printing jobs spooled in the
spool section 181 on the liquid crystal panel 181.
While observing the display, the user specifies the
printing job which was requested to print by himself.
Next, the network printing apparatus 2 displays the
10   other network printing apparatuses 3, 4 to which the
printing job can be transferred and the spool states of
the printing jobs in the network printing apparatuses
3, 4. While observing the display, the user specifies
the network printing apparatus 3 in which no printing
15   job is spooled, for example.

When receiving the specification, the network
printing apparatus 2 transfers the specified printing
job to the network printing apparatus 3. Then, the
network printing apparatus 3 to which the printing
20   job is transferred instantly performs the printing
operation.

According to the network printing apparatus of the
first embodiment, the user can easily transfer his own
printing job to another network printing apparatus when
25   the requested printing operation is set in a wait state
in the network printing apparatus which is requested to
print by the user.

Further, since the printing job can be transferred to a desired one of the network printing apparatuses in the present place when the user goes to pick up printed paper in order to check whether the printing operation is completed or not, the operability of the printing job transfer process of the network printing apparatus can be enhanced.

(Second Embodiment)

Next, a second embodiment is explained. In this case, portions which are the same as those of the first embodiment are denoted by the same reference symbols and the detailed explanation thereof is omitted.

A network printing apparatus of the second embodiment is different from the network printing apparatus of the first embodiment in that an operating section 6 does not have function of permitting the user to transfer a printing job. Further, as shown in the control block diagram of the network printing apparatus of FIG. 6, a web page section 183 which provides information of printing jobs spooled in a spool section 181 and information of other network printing apparatuses connected to a network 5 on a web page is provided in an HDD 18. For example, access can be made to the web page from the browser of a PC 4 by use of HTTP (hyper text transfer protocol).

A process performed by a CPU 12 of the network printing apparatus with the above configuration is

explained with reference to FIG. 7.

In step ST201, a printing job is received.
The printing job is spooled in the spool section 181
in step ST202. Whether the printing job spooled in the
spool section 181 has been printed or not is determined
in step ST203. If it is determined in the above
determination step that the printing job has been
printed, the process is terminated. If it is
determined that the printing job has not been printed,
whether access to a web page provided by the web page
section 183 from the PC 4 has been made or not is
determined in step ST204. If it is determined that no
access has been made, the process returns to step
ST203. The above process is repeatedly performed until
the printing operation of the printing job spooled in
the spool section 181 is terminated.

If it is determined that access from the PC 4 has
been made, a list of the printing jobs spooled in the
spool section 181 is displayed on the web page in step
ST205. Whether a user ID registered in the PC 4 which
makes access indicates an administrator or a general
user is determined in step ST206. If it is determined
in the above determination step that the user ID
indicates the administrator, the specification of
a printing job to be transferred among all of the
printing jobs is received in step ST207. If it is
determined that the user ID indicates the general user,

the specification of a printing job to be transferred
among the printing jobs transmitted by the user is
received in step ST208.

Next, network printing apparatuses to which the
5   printing job can be transferred are searched for in
step ST209. Then, communication is made to each of the
network printing apparatuses to which the printing job
can be transferred and the spool states of the printing
jobs in the network printing apparatuses are searched
10   for in step ST210. Lists of the network printing
apparatuses to which the printing job can be
transferred and the spool states of the network
printing apparatuses are displayed on the web page in
step ST211.

15   After this, the specification of the network
printing apparatus to which the printing job is
transferred and which is selected from the network
printing apparatuses displayed on the web page is
received in step ST112. The specified printing job is
20   transferred to the specified network printing apparatus
in step ST113 and the process is terminated.

In the above network 5, if the printing operation
of the network printing apparatus to which the user
makes a printing request is set in the waiting mode,
25   the printing job of the user can be specified on
the web page, the network printing apparatus of the
transferring destination can be specified and thus

the printing job can be transferred.

Like the network printing apparatus of the first embodiment, according to the second embodiment, if the printing operation of the network printing apparatus to which the user makes a printing request is set in the waiting mode, the user can easily transfer his own printing job to another network printing apparatus.

Further, since information of the printing jobs spooled and information of the other network printing apparatuses are displayed as the web page on the display 27 of the PC 4, a large amount of information can be displayed on one display screen and the user can easily observe the information.

Generally, since access software for the web page is incorporated in the PC, the above effect can be obtained simply by adding the function of providing the web page to the network printing apparatus.

(Third Embodiment)

Next, a third embodiment is explained. In this case, portions which are the same as those of the first embodiment are denoted by the same reference symbols and the detailed explanation thereof is omitted.

A network printing apparatus of the third embodiment is different from the network printing apparatus of the first embodiment in that an operating section 6 has no function of permitting the user to transfer a printing job.

Further, as shown in the control block diagram of
the network printing apparatus of FIG. 8, a collecting
section 184 which collects information of spooled
printing jobs and information of other network printing
5   apparatuses when a prescribed instruction is received
from an application is provided in an HDD 18.

In addition, as shown in the control block diagram
of the PC of FIG. 9, an application section 311 storing
an application which permits the network printing
10   apparatus to collect information of printing jobs
spooled in the network printing apparatus to which
the computer itself transmits the printing job and
information of the other network printing apparatuses,
receive the specification of the printing job and the
15   specification of the network printing apparatus after
acquiring the above information and transmit the
received specifications as information to the network
printing apparatus is provided in an HDD 31.

FIG. 10 is a diagram showing the flow of a process
20   performed by a CPU 12 of the network printing
apparatus.

In step ST301, a printing job is received.
The printing job is spooled in the spool section 181 in
step ST302. Whether the printing job spooled in the
25   spool section 181 has been printed or not is determined
in step ST303. If it is determined in the above
determination step that the printing job has been

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printed, the process is terminated. If it is
determined that the printing job has not been printed,
whether the application stored in the application
section 311 of the PC 4 has been started or not is
determined in step ST304. If it is determined that the
application has not been started, the process returns
to step ST303. The above process is repeatedly
performed until the printing operation of the printing
job spooled in the spool section 181 is terminated.

     If it is determined that the application has
started, information of a list of the printing jobs
spooled in the spool section 181 is collected in step
ST305. Whether a user ID registered in the PC 4 which
makes access indicates an administrator or a general
user is determined in step ST306. If it is determined
in the above determination step that the user ID
indicates the administrator, the specification of
a printing job to be transferred among all of the
printing jobs is received according to the application
of the PC in step ST307. If it is determined that the
user ID indicates the general user, the specification
of a printing job to be transferred among the printing
jobs transmitted by the user is received according to
the application of the PC in step ST308.

     Next, network printing apparatuses to which the
printing job can be transferred are searched for in
step ST309. Then, communication is made to the network

printing apparatuses to which the printing job can be
transferred and the spool states of the printing jobs
in the network printing apparatuses are searched for in
step ST310. Lists of the network printing apparatuses
5   to which the printing job can be transferred and the
spool states of the network printing apparatuses are
collected in step ST311.

After this, the specification of the network
printing apparatus to which the printing job is
10   transferred is received based on the application of the
PC in step ST312. Then, the specified printing job is
transferred to the specified network printing apparatus
in step ST313 and the process is terminated.

Like the network printing apparatus of the first
15   embodiment, according to the third embodiment, if the
printing operation of the network printing apparatus to
which the user makes a printing request is set in the
waiting mode, the user can easily transfer his own
printing job to another network printing apparatus.

20   Further, since information of the printing jobs
spooled and information of the other network printing
apparatuses are displayed on the display 27 according
to the application stored in the application section
311 of the PC 4, a large amount of information can be
25   displayed on one display screen and the user can easily
observe the information.

In each of the above embodiments, the spool

section 181 which spools the printing jobs is provided
in the HDD 18 of the network printing apparatus, but if
a network printing apparatus which does not have an HDD
18 is used, the spool section 181 may be provided in
5   the RAM 14 and the transferring section 182 may be
provided in the ROM 13, for example.

Further, a case wherein the network printing
apparatus searches for the network printing apparatuses
to which the printing job can be transferred after the
10   printing job is specified if it transfers the printing
job, then searches for the spool states of the printing
jobs in the network printing apparatuses and receives
the specification of one of the network printing
apparatuses is explained. However, this invention is
15   not limited to the above case and it is possible to
receive the specification of the printing job and the
specification of the network printing apparatus from
the user after information of the printing jobs spooled
and the network printing apparatuses to which the
20   printing job can be transferred are searched for and
the spool states of the printing jobs of the network
printing apparatuses are searched for.

Additional advantages and modifications will
readily occur to those skilled in the art. Therefore,
25   the invention in its broader aspects is not limited to
the specific details and representative embodiments
shown and described herein. Accordingly, various

modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.